

Florida Department of Transportation District Five

Daytona Area Event Management

Concept of Operations

**August 2016
FINAL**



Prepared for:

Florida Department of Transportation District Five
Intelligent Transportation Systems (ITS) Section
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List of Acronyms and Abbreviations

ADMS	Arterial Dynamic Message Signs
APL	Approved Products List
ASC	Adaptive Signal Control
ATC	Advanced Traffic Controller
ConOps	Concept of Operations
DMS	Dynamic Message Sign
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
GIS	Geographic Information System
GUI	Graphical User Interface
ITS	Intelligent Transportation System
LAN	Local Area Network
MOU	Memorandum of Understanding
NITSA	National ITS Architecture
NTCIP	National Transportation Communications for ITS Protocol
RITSA	Regional Intelligent Transportation System Architecture
RTMC	Regional Traffic Management Center
SITSA	Statewide Intelligent Transportation System Architecture
SEMP	Systems Engineering Management Plan
TERL	Traffic Engineering Research Lab
TMC	Traffic Management Center

1. Overview

1.1 Identification

This document identifies the Concept of Operations (ConOps) for integrating, updating and redefining the Intelligent Transportation System (ITS) components and their locations to facilitate traffic flow before and after an event around eastern Volusia County. The existing and proposed ITS, signals devices and system components are discussed, as well as the relationships and responsibilities of the various agencies for an effective event management solution within the Daytona area.

Some of the major events that impact traffic in the area of the Daytona International Speedway are:

- Daytona 500
- Coke Zero 400
- Bike week
- Biketoberfest
- Country 500
- Speedweek
- SCCA CFR Regional
- Red Bull Global Rallycross
- Fall Cycle Scene
- Ferrari World Finals
- Jeep Beach
- Incidents on I-95

1.2 Document Overview

A ConOps document includes the proposed environment of the system and the system utilization by stakeholders and associated agencies. It specifically describes the ITS and Signal components that are already in place or are being proposed for future deployment in Volusia County to support the needs of the agencies and the public.

This document is organized as follows:

- Section 1 – Overview
- Section 2 – Referenced Documentation
- Section 3 – Current System Situation
- Section 4 – Justification and Nature of the Changes
- Section 5 – Concepts for the Proposed System
- Section 6 – Operational Scenarios
- Section 7 – Summary of Impacts

Section 8 – Analysis of the Proposed System
Appendices

The development of the Concept of Operations for Daytona Area Event Management is based on a number of guidelines and builds upon planning, reports, and documentation developed prior to the development of this Concept of Operations.

The development of this Concept of Operations for Daytona Area Event Management was developed in accordance with guidelines and information presented on the Florida Department of Transportation's (FDOT) Systems Engineering Management Plan (SEMP) website, which can be found at the following link:

http://www.dot.state.fl.us/trafficoperations/ITS/Projects_Deploy/SEMP.shtm

1.3 *System Overview*

The City of Daytona Beach owns and operates 58 miles of fiber optic cable, approximately 70 traffic surveillance cameras, wireless connections to remote cameras, and traffic signals which are linked to the City's Traffic Management Center (TMC). The City's TMC has four viewing and control workstations, and a three-monitor video wall. The TMC is currently in the City's signal shop located at 950 Bellevue Avenue, Daytona Beach FL 32114.

The City and the Speedway manages the traffic system around the Speedway events with the assistance of local agencies, such as the FDOT, Daytona Beach Police Department, FHP and Volusia County. The FDOT supports the City by providing an FDOT representative to be present on event days. This representative operates approximately 40 Dynamic Message signs (DMS) on I-4, I-95, and state arterial roadways. The Department also provides support by using surveillance cameras that are full pan-tilt-zoom, which gives operators the ability to use the wide range of motion to quickly identify and mitigate any potential issues. The DMS are also particularly useful for directing traffic. Small DMS signs are used to direct traffic to the parking lots. The Florida 511 system and a local radio station are also used in order to disseminate information to the event's attendees.

In addition, FDOT has an Adaptive Signal System on SR 400 to assist with traffic congestion. Volusia County also has existing infrastructure in the area. There is also an extensive fiber network in the area of East Volusia. Some of the additional infrastructure is described in the following sections of this report.

The proposed improvements to the Daytona Area, detailed in the following sections, are being installed to manage traffic throughout the County more effectively and proactively during events. The communication system being installed will provide the local agency operation's centers with

the ability to communicate to the field devices within their jurisdiction. Each sub-system will provide benefit to both the operations center personnel as well as the driving public.

The following descriptions outline the roles and responsibilities for the system:

Project Sponsors – Agencies that are involved in funding the system and defining the system’s goals, objectives, and requirements for Daytona Area Event Management. The Sponsors included in this project are listed as follows:

- Florida Department of Transportation, District Five

User Agencies – Agencies that will utilize the devices and infrastructure installed under this system for traffic monitoring, congestion management, traffic incident management, performance measures, data collection, and roadway improvement. The User Agencies included in this project are listed as follows:

- Volusia County
- Police and Emergency Responders
- City of Daytona Beach
- City of Ormond Beach
- Speedway

Maintenance and Operation Agencies – Agencies that will be responsible to maintain and operate the ITS system equipment and infrastructure are listed as follows:

- Volusia County
- City of Daytona Beach
- Florida Department of Transportation, District Five

Agency Contact Information

Agency	Address	Phone
Florida Department of Transportation, District Five	719 S. Woodland Blvd. DeLand, FL 32720-6800	1-800-780-7102
Volusia County	123 W. Indiana Ave. DeLand, FL 32720	386-257-6000
City of Daytona Beach	301 S. Ridgewood Ave., Daytona Beach, FL 32114	386-671-8400
Daytona International Speedway	1801 W International Speedway Blvd Daytona Beach, FL 32114	1-800-748-7467
Daytona Beach Police Department	129 Valor Blvd. Room 3001 Daytona Beach, FL 32114	386-671-5102
Florida Highway Patrol	1551 E. International Speedway Blvd. Deland, FL 32724	386-736-5350
City of Ormond Beach	22 South Beach Street Ormond Beach, FL 32174	386-677-0311

Table 1 – Agency Contact Information

2. Referenced Documentation

The following documents, of the exact issue shown, form a part of this document to the extent specified herein. In the event of a conflict between the contents of the documents referenced herein and the contents of this document, this document shall be considered the superseding document. Additionally, noted documents will be developed in support of or, in conjunction with, the preparation and definitions of this Concept of Operations.

DOCUMENT	DATE	CONTACT
FDOT ConOps Template	3/18/16	Derek.Vollmer@dot.state.fl.us

Table 2 – Referenced Documentation

3. Current System Situation

3.1 Background, Objectives, and Scope

The Daytona Area currently has existing ITS infrastructure consisting of various ITS sub-system components, which are interconnected via a fiber optic network, copper interconnect and wireless antennas along the arterial roadways. There are several existing ADMS that are on existing roadways leading to the Daytona International Speedway. These ADMS are currently not operational. The FDOT RTMC can no longer communicate to devices and are therefore to be removed as part of the proposed project.

The primary objective for this project is for motorists to ingress and egress the various parking lots in a timely manner as well as alternative routes for incidents on I-95. These routes can be found at **Appendix A**. Various agencies contribute information, equipment, and manpower in order to maximize the efficiency of the process on event days. Currently, events management relies highly on the City of Daytona Beach, the City of Daytona Beach Police Department, FHP, Volusia County traffic engineering and the FDOT employees.

3.2 Operational Constraints

The existing ITS system cannot meet the demands that occur from the events at the Daytona International Speedway. This constraint limits the activities that occur in the area due to event organizers considering the impacts that the congestion has on their attendees. By revamping the ITS system, increasing motorist information and awareness, and reducing congestion, more event organizers will consider holding their events in the Daytona area.

The existing ITS system also has constraints with information dissemination. As stated earlier in the document, some of the existing ITS devices within the limits of the Daytona International

Speedway are non-operational. The existing ITS infrastructure and existing devices are shown within **Appendix B**.

3.3 *Description of the Current System or Situation*

Daytona Beach is home to many events which hosts large volumes of people. The City currently has limited resources and roadway capacity for routing the public to and from events such as the Daytona 500. While the International Speedway Corporation does not release the official attendance figures, an estimated 250,000 fans attend the Daytona 500 each February. Another event that Daytona Beach hosts annually is Bike Week. Bike Week attracts approximately 500,000 people to the area for the 10 day event every year.

Currently, during major events at the Daytona International Speedway, the City of Daytona Beach and Volusia County temporarily disable traffic signals surrounding the Speedway and Law Enforcement officers manually route traffic to parking Lot 7. After the event is over, law enforcement generally route all traffic leaving the Speedway to SR 40 to go south or north on I-95. The City of Ormond Beach stated that it takes an estimated 3-4 hours to clear the area of congestion after each event.

The Daytona International Speedway is also investing in redevelopment to increase the demand for use during the rest of the year. The redevelopment with over 300,000 square feet and a projected investment of approximately \$120 - \$150 million, called ONE DAYTONA is a significant project anchored by several shops, theater, hotels, and an approximately 300-unit residential apartment community including a four-story midrise campus and garden style complex. ONE DAYTONA will quickly become synonymous with visitors, meeting and convention delegates, race fans and residents as east Central Florida's place to live, work, stay and play.¹

3.4 *User Profiles*

The City of Daytona Beach TMC uses the Advanced Traffic Controller (ATC) traffic signal controllers. The city also uses Adaptive Signal Control (ASC) for 22 intersections on US 92. The City's traffic signal cabinets are currently at capacity and any new equipment will have to be installed inside new cabinets.

Blank-out signs, ADMS and Bluetooth sensors will be proposed in this project on all approaches of the major intersections to the Speedway and the surrounding area. The following sections provide details of the proposed equipment. The end user of the signal and ITS systems is the motoring public. Motorists will benefit from the blank-out signs in addition of ITS devices when approaching the intersections by having reduced travel delays when traveling during the event

¹ <http://www.onedaytona.com/>

days. An anticipated result of these travel delays is that people have less apprehension about participating in these events, which would increase attendance and result in more people purchasing goods and services from local businesses.

3.5 *Support Environment*

The City of Daytona Beach and Volusia County are the only agencies that operate signals surrounding the Daytona International Speedway. Volusia County operates the signals for both the City of Ormond Beach and the City of Holly Hill within their respective city limits. Those agencies will continue to maintain and operate the signal controllers and associated equipment. The FDOT will maintain any new ITS equipment to be installed under this project. If any upgrades to the City and County cabinets are required, the City and County will be responsible for maintaining these upgraded or new cabinets.

4. Justification and Nature of the Changes

4.1 *Justification for Changes*

According to the Daytona Event Planning Report by Ghyabi & Associates, Inc, some of the key issues that are to be addressed include:

- Complexity of guidance to parking areas can be confusing for motorists.
- Direction to Lot 7 is minimal or not observed.
- Communication with the TMC has technology problems which cause delays with response by FHP and other agencies.

4.2 *Description of the Desired Changes*

The District has identified ITS as an integral part of providing innovative services to motorists in the Daytona Beach area. By coordinating with local Cities and County agencies, the District is attempting to populate ITS equipment on arterial roadways to ease traffic congestion on major Arterial Roadways and to help with event management around the Daytona International Speedway. Bluetooth devices are proposed in this project to collect data for travel time information. This data is to be used for the demand management and information system. As shown in other areas of the State of Florida, the effectiveness of ADMS placements results in assisting with traffic management on an arterial roadway level, alleviating backups and offering time savings on the roadways. ADMS will be installed on arterial roadways that lead to Lot 7 and Daytona International Speedway. The ADMS will be connected to fiber optic cable and will utilize its own power source. Locations of ADMS are indicated in **Appendix C**.

Blank-out signs will also be added to inform and direct motorists to event parking, detours, etc. These devices will help in assisting the motorist with traffic flow on the desired roadways. Blank-out signs will be installed approaching the intersection and at the intersections, as

indicated in **Appendix C**. One sign will be located approximately two hundred feet prior to the turn lane and the other will be mounted on the intersection's mast arms or strain poles. These signs will communicate to a controller cabinet that will be connected to fiber optic cable. This new system will be separated from the existing traffic signal's cabinets. These signs will be wired to have pre-established messages that will be operated and by the FDOT RTMC or the FDOT staff at the Daytona Beach TMC during events.

4.3 *Change Priorities*

Several different scenarios are being analyzed to determine the feasibility and cost for the best implementation to assist with the alleviation of congestion. A cost analysis was developed to determine the type of equipment that would be used in this project that would meet the FDOT budget and satisfy the needs of the City, County, residents and visitors during the events in the area. The priorities determined to be feasible are: blank-out signs, ADMS and Bluetooth devices and the Purdue Performance Metrics for monitoring traffic and signal performance.

4.4 *Changes Considered but Not Included*

Changing the existing traffic signal controllers to an Adaptive System and re-timing were considered but will not be included in this project due to budgetary constraints.

4.5 *Assumptions and Constraints*

The equipment and software chosen for this project will be compatible with the components that already exist in the area and will facilitate the operation and maintenance of all ITS devices. All applicable devices will be listed on the FDOT Statewide Approved Products List (APL), which will ensure that they have been tested by the FDOT Traffic Engineering Research Lab (TERL) and are certified to meet FDOT Standards.

Project constraints include funding for the operating and maintaining agencies to provide adequate staff and maintenance. Without funding for operations and maintenance of the system, the system will not operate as proposed and will therefore not provide the benefits stated throughout this document.

5. Concepts for the Proposed System

5.1 *Background, Objectives, and Scope*

The expansion of the current system to include additional ADMS, Blank-out Signs, and Bluetooth sensors on arterial roadways around Daytona International Speedway is proposed to inform motorists of the appropriate route to parking lots during events. The additional device sites will also allow the FDOT District Five RTMC to disseminate travel time and other

important traffic related information to motorists as well as trailblazing of routes specifically to Lot 7, handicap parking and I-95 detours.

The ADMS, Blank-out Signs, and Bluetooth Sensors will communicate to the RTMC via fiber optic communications or a combination of fiber optic and wireless technologies. Operators at the RTMC will be able to post messages on ADMS to alert motorists of important information after the motorist exits I-95 as they drive toward the Speedway and Lot 7. The SunGuide® software, which is used by the RTMC to control all of their ITS devices, has an interface driver, which will enable the Operator to post a message on the correct ADMS using a Graphical User Interface (GUI). An interface driver may need to be developed in order for the Department to control the messages on the Blank-out signs.

Not only will this system be used for events, but to also assist with detouring motorists when an incident happens on I-95. The DMS messages may be posted at several interchanges both upstream and downstream of the incident. Motorists can then use this information to reroute in order to avoid congestion and delays.

5.2 *Operational Policies and Constraints*

The District's RTMC operates around the clock, seven days a week. The RTMC always has at least 1 Shift Supervisor and 1 TMC Operator. During weekday peak hours, a second RTMC Operator and 511 Operators are also on duty to monitor the additional traffic. For further information on staffing, see Section 5.4.

Due to the involvement of several agencies within the project limits, a Memorandum of Understanding (MOU) will be required to ensure all stakeholders are in agreement with the way operations will be conducted, including the City of Daytona Beach, Volusia County, and Daytona International Speedway. In addition to the devices and features being proposed to be implemented, another improvement includes the development of pre-event signal plans to help flush traffic. Traffic controller clocks will be required to be synced to GPS to allow for inter-agency coordination.

5.3 *Description of the Proposed System*

There will be 6 proposed ADMS within the Daytona Event Management project limits. The ADMS will be strategically located near interchanges of local roadways with I-95 and will provide information for motorists traveling toward the Daytona International Speedway. They will be placed 1-mile or less from I-95, east of the key interchanges identified below:

- I-95 @ SR 400
- I-95 @ US 92
- I-95 @ LPGA Blvd.
- I-95 @ SR 40

- I-95 @ US 1
- Clyde Morris Blvd & LPGA Blvd.

The ADMS system design will be in accordance with the statewide and District Five Regional ITS Architectures (RITSA). The proposed communications infrastructure will provide the necessary support to implement regional architecture flows between ITS centers and agencies in the region according to the following regional service packages which are currently not included within the FDOT District Five RITSA.

There will be 71 blank-out signs and 24 Bluetooth sensors within the Daytona Event Management project limits. The Blank-out signs will be located at intersections which typically comprises of heavy traffic for events within the area of the Daytona International Speedway. One blank-out sign and, preferably, one Bluetooth sensor will be installed approximately 200 feet upstream from the intersection in the direction of travel toward the speedway. The other sign will be located on a mast arm or signal strain pole at the intersections identified below:

- SR 400 & Williamson Blvd
- SR 400 & SR 483 (Clyde Morris Blvd)
- SR 400 & SR 5A
- Midway Ave & Speedway Rear Entrance
- Midway Ave & Richard Petty Blvd
- US 92 & LPGA Blvd
- US 92 & Williamson Blvd
- US 92 & Turn One Dr
- US 92 & Bill France Blvd
- US 92 & Midway Ave
- US 92 & SR 483 (Clyde Morris Blvd)
- US 92 & SR 5A (Nova Rd)
- SR 430 & SR 483 (Clyde Morris Blvd)
- SR 430 & SR 5A
- CR 483 (Clyde Morris Blvd) & Jimmy Ann Dr
- LPGA Blvd & Williamson Blvd
- LPGA Blvd & CR 483 (Clyde Morris Blvd)
- LPGA Blvd & SR 5A
- SR 40 & Williamson Blvd
- SR 40 & CR 483 (Clyde Morris Blvd)
- SR 40 & SR 5A
- US 1 & SR 5A

5.4 Modes of Operation

FDOT District Five envisions the following modes of operation:

Standard / After-Hours – The FDOT District Five RTMC operates on a 24/7/365 schedule.

- M-F - Three shifts: 6am-2pm, 2pm-10pm, 10pm-6am
 - 6am-2pm - Lead Supervisor and Three Operators
 - 2pm-10pm - Lead Supervisor and Three Operators
 - 10pm-6am - Lead Supervisor and Two Operators
- M-F - TMC Manager is on from 8am-5:30pm
- M-F – 3pm-8pm – One Split Shift Operator
- Weekend - Two shifts: 10am-10pm, 10pm-10am
 - 10am-10pm - Lead Supervisor and Two Operators
 - 10pm-10am - Lead Supervisor and Two Operators
- Weekend - Flex shifts – One Operator - 6am-2pm, 2pm-10pm

Maintenance – Emergency Maintenance and Preventative Maintenance will be performed by the District Five ITS Maintenance Contractor. Preventative maintenance for the ADMS System will be performed according to manufacturers' specifications and requirements.

Emergency – Emergency operations shall be coordinated with the Volusia County Emergency Operations Centers (EOC) based on their policy and procedures.

5.5 User Involvement and Interaction

The SunGuide® Software includes an incident management subsystem. The subsystem incorporates a graphical user interface (GUI) and geographic information system (GIS) map of the region. The software includes an interface to control Arterial Dynamic Message Signs. This software interface will be used to post messages to the ADMS and clear the messages once the message is no longer valid. The project also proposes to give City of Daytona secondary control of the DMS signs.

5.6 Support Environment

Following Project Acceptance, the device components will be turned over to the Department in proper working order and will have a manufacturer warranty period covering defects in assembly, fabrication, and materials from the date of final acceptance by the Engineer. Immediately following after Project Acceptance or the Contractor maintenance period, the routine and periodic maintenance of the installations will be the responsibility of the District Five ITS Maintenance Group. Should any part fail during the Warranty Period, the Contractor or the District Five ITS Maintenance Contractor will remove the part, send it back to the Manufacturer

for repair or replacement and receive the new/repaired part for stockpiling. After the Warranty Period has expired, all costs associated with the repair or replacement of previously warranted parts will be paid for by FDOT District Five.

6. Operational Scenarios

During the events at the Daytona International Speedway, signal timings around the event will be adjusted to provide help with the congestion. The changes to the signal timings will be addressed in pre-set plans for traffic signals. This will indicate the signal timing adjustments needed for each event.

7. Summary of Impacts

Key system stakeholders for the Volusia County signal system include but are not limited to, FDOT, City of Daytona Beach, City and County police, emergency operations, transit agencies, pedestrians, and motorists. The Event Management signs and Bluetooth readers will enhance the capabilities of the existing system and therefore are anticipated to provide benefits to all stakeholders. The summaries of impacts are:

- Disseminate traffic information to motorists
- Re-route traffic during events at the Daytona International Speedway and when there are lane closures on I-95 due to incidents
- Improved travel time reliability and reduced congestion
- Provide new information and a “Tool” to RTMC operators, City of Daytona Beach, City of Daytona Beach Police Department and FHP to assist them in performing their duties

8. Analysis of the Proposed System

The proposed system will be a beneficial and integral part of providing innovative routing to the motorists around Daytona International Speedway (handicap parking) and in/out of the parking lot 7 (public parking). The use of ADMS and Blank-out signs, in conjunction with Bluetooth readers, will provide information to motorists regarding events at the Daytona International Speedway and potentially reduce travel time as well as providing additional safety to motorists and pedestrians. The system will also minimize the use of Law Enforcement personnel to direct traffic. The project is proposed to be implemented, from design to construction, during a two year period.

Appendix A – Route Configurations

I-95 INCIDENTS/DETOURS

LEGEND



TRAFFIC SIGNAL



US 92 AND SR 400 DETOUR



US 92 AND SR 400 DETOUR (ALT)



LGPA BLVD. AND US 92 DETOUR



LGPA BLVD. AND US 92 DETOUR (ALT)



SR 40 AND LGPA BLVD. DETOUR



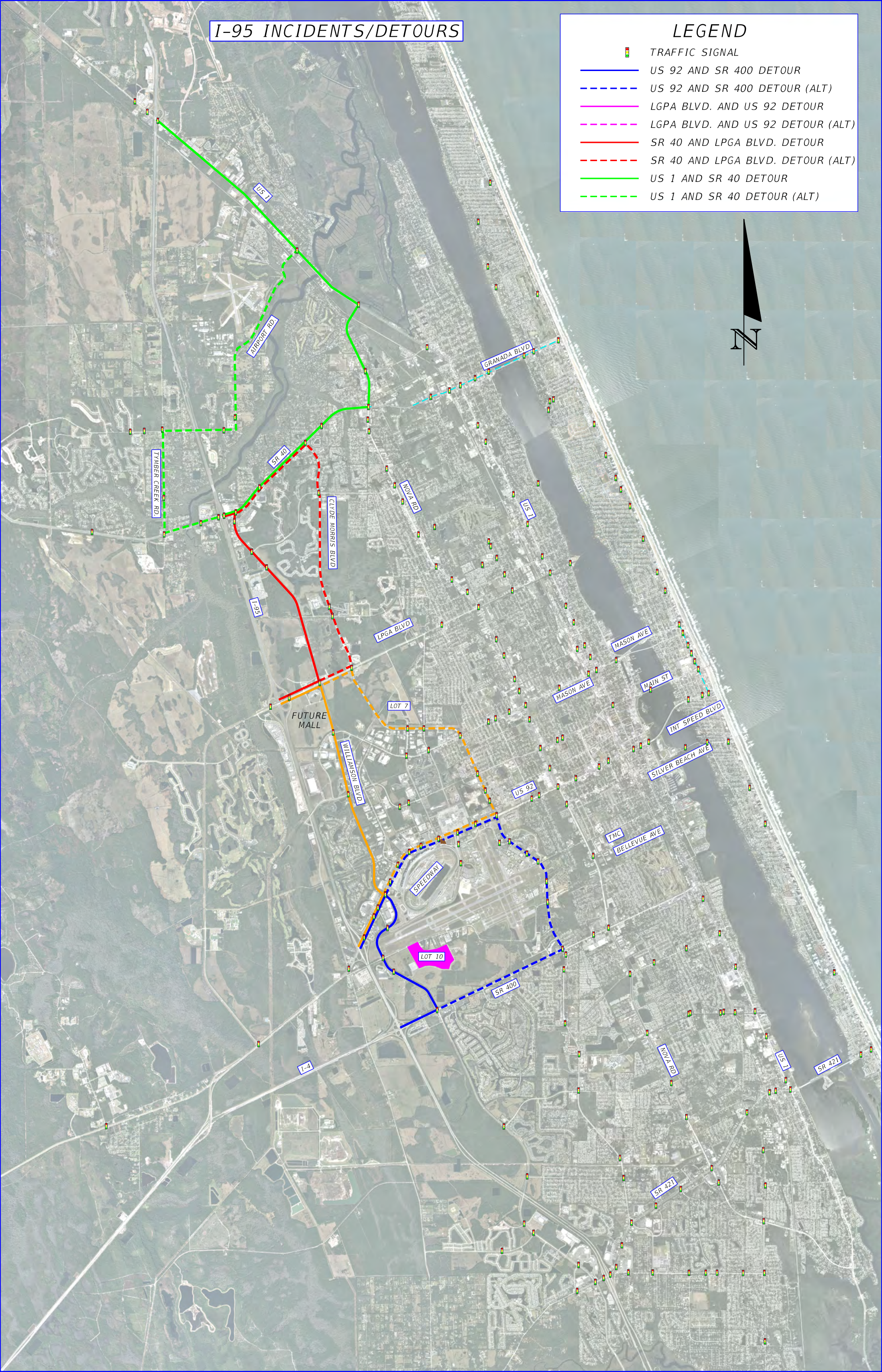
SR 40 AND LGPA BLVD. DETOUR (ALT)



US 1 AND SR 40 DETOUR










US 1 AND SR 40 DETOUR (ALT)



LOT 7 EGRESS ROUTES











LEGEND

-  *PARKING LOTS*
 *PARKING LOT 7*
 *TRAFFIC SIGNAL*
 *EGRESS NB I-95*
 *EGRESS SB I-95*
 *EGRESS NB/SB I-95*
 *SPEEDWAY BUS ROUTE*



LOT 7 INGRESS ROUTES

LEGEND

-
-  *PARKING LOTS*
 *PARKING LOT 7*
 *TRAFFIC SIGNAL*
 *INGRESS NB*
 *INGRESS SB*
 *INGRESS SB (ALTERNATIVE)*
 *INGRESS EB*
 *INGRESS EB (ALTERNATIVE)*
 *INGRESS WB*
 *SPEEDWAY BUS ROUTE*



Appendix B - Existing ITS Devices

EXISTING ITS DEVICES

LEGEND

- TRAFFIC SIGNAL
- EXISTING FDOT CCTV
- EXISTING COUNTY CCTV
- EXISTING 2 CCTV
- EXISTING DMS
- DAYTONA BEACH EXISTING FIBER
- FDOT EXISTING FIBER
- VOLUSIA COUNTY EXISTING FIBER
- CITY OF ORMOND BEACH EXISTING FIBER



Appendix C - Proposed ITS Devices

PROPOSED ITS DEVICES

LEGEND

- PARKING LOT 1
- PARKING LOT 4
- PARKING LOT 6
- PARKING LOT 7
- ADDITIONAL PARKING
- TRAFFIC SIGNAL
- PROPOSED BLANK OUT SIGN
- PROPOSED BLUE T00TH
- PROPOSED ADMS

